FORM PTO-1390 US DEPARTMENT OF COMMERCE REV. 5-93PATENT AND TRADEMARK OFFICE **TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371**	ATTORNEYS DOCKET NUMBER **P01,0085** U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 09/763769

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/06285	**26 AUGUST 1999**	**28 AUGUST 1998**

TITLE OF INVENTION

TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR ITS OPERATION

APPLICANT(S) FOR DO/EO/US **STEFAN HENNEN ET AL**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2)) - drawings attached.
   a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2) - drawings attached.

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; **(PTO 1449, Prior Art, Search Report, 02 References).**

12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included. **(SEE ATTACHED ENVELOPE)**

13. ☒ Amendment "A" Prior to Action and Appendix "A".
    ☐ A SECOND or SUBSEQUENT preliminary amendment.

14. ☒ A substitute specification and substitute specification mark-up.

15. ☒ A change of address letter attached to the Declaration.

16. ☒ Other items or information:
    a. ☒ Appointment of Associate Power of Attorney

    b. ☒ EXPRESS MAIL #EL655301182US dated February 26, 2001

U.S. APPLICATION NO (if known, see 37 C.F.R. 1.5) 09/763769	INTERNATIONAL APPLICATION NO PCT/EP99/06285	ATTORNEY'S DOCKET NUMBER P01,0085

17. ☒ The following fees are submitted:	CALCULATIONS	PTO USE ONLY
BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5): Search Report has been prepared by the EPO or JPO $860.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) $690.00 No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but international search fee paid to USPTO (37 C.F.R. 1.445(a)(2) $710.00 Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2) paid to USPTO $1000.00 International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) $ 100.00		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860.00	
Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$	

Claims	Number Filed		Number Extra	Rate		
Total Claims	33	- 20 =	13	X $ 18.00	$ 234.00	
Independent Claims	02	- 3 =	0	X $ 80.00	$	
Multiple Dependent Claims				$270.00 +	$	
				TOTAL OF ABOVE CALCULATIONS =	$ 1094.00	
Reduction by ½ for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)					$	
				SUBTOTAL =	$ 1094.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +					$	
				TOTAL NATIONAL FEE =	$ 1094.00	
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). $40.00 per property +						
				TOTAL FEES ENCLOSED =	$ 1094.00	
				Amount to be refunded	$	
				charged	$	

a. ☒ A check in the amount of $1094.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No._____ in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1519. **A duplicate copy of this sheet is enclosed.**

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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BOX PCT
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

PRELIMINARY AMENDMENT A
PRIOR TO ACTION

APPLICANT(S):	Stefan Hennen et al
ATTORNEY DOCKET NO.:	P01,0085
INTERNATIONAL APPLICATION NO:	PCT/EP99/06285
INTERNATIONAL FILING DATE:	26 August 1999
INVENTION:	TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR ITS OPERATION

Assistant Commissioner for Patents,
Washington D.C. 20231

Sir:

Applicants herewith amend the above-referenced PCT application, and request entry of the Amendment prior to examination on the United States Examination Phase.

IN THE CLAIMS:

On page 8:

replace line 1 with --WHAT IS CLAIMED IS:--;

Please replace original claims 1-33 with the following rewritten claims 1-33, referring to the mark-ups in Appendix A.

1. (Amended) A method for operating a telecommunication system that contains data traffic units and clock handling units that can comprise both lines as well as assemblies, in which at least one part can be redundantly operated, said method comprising the steps of:

defining a redundancy for a defined redundancy entity, said defined redundancy entity being either at least one part of said data traffic units or at least one part of said clock handling units;

establishing said defined redundancy for said defined redundancy entity; and

establishing a redundancy corresponding to said defined redundancy for at least one other part which is not said defined redundancy entity.

2. (Amended) The method according to claim 1, wherein said telecommunication system is an ATM telecommunication system.

3. (Amended) The method according to claim 1, wherein one of said steps of establishing comprises the step of writing at least one data bank which can be a central or a local data bank.

4. (Amended) The method according to claim 1, wherein said step of establishing said redundancy corresponding to the defined redundancy comprises a step of determining said defined redundancy.

5. (Amended) The method according to claim 4, wherein said step of establishing said defined redundancy is software-controlled.

6. (Amended) The method according to claim 1 wherein said step of establishing said redundancy corresponding to said defined redundancy sets this redundancy hardware-controlled.

7. (Amended) The method according to claim 1, further comprising the step of selecting one of redundant data traffic units and clock handling units.

8. (Amended) The method according to claim 1, wherein said step of defining said redundancy ensues for at least a part of said data traffic units and a redundancy corresponding thereto is established for at least a part of said clock handling units.

9. (Amended) The method according to claim 1, wherein at least one of said defined redundancies or redundancies corresponding thereto is a board redundancy.

10. (Amended) The method according to claim 1, wherein at least one of said defined redundancies or redundancies corresponding thereto is a line redundancy.

11. (Amended) The method according to claim 1, wherein at least one of said defined redundancies or redundancies corresponding thereto is a 1:N redundancy.

12. (Amended) The method according to claim 11, wherein said 1:N redundancy is a 1:1 redundancy.

13. (Amended) The method according to claim 1, wherein at least one of said defined redundancies or redundancies corresponding thereto is a 1+1 redundancy.

14. (Amended) The method according to claim 1, further comprising the step of providing at least one interface card which is a part of at least one part of said data traffic units.

15. (Amended) The method according to claim 1, further comprising the step of providing at least one interface card which is a part of at least one part of said clock handling units.

16. (Amended) The method according to claim 1, further comprising the step of providing a clock generator which is a part of at least one part of said clock handling units.

17. (Amended) A telecommunication system, comprising:

data traffic units for implementing data traffic, said data traffic units capable of comprising lines and assemblies and capable of being redundantly operated;

clock handling units for clock handling, said clock handling units capable of comprising lines and assemblies and capable of being redundantly operated;

a data traffic unit redundancy mechanism for establishing a redundancy of at least one part of said data traffic units; and

a clock handling unit redundancy mechanism for establishing a redundancy of at least one part of said clock handling units;

said data traffic unit redundancy mechanism and said clock handling unit redundancy mechanism being connected to one another such that they enable establishing the redundancy of one of said mechanisms for establishing by transferring the redundancy of the other mechanism for establishing a redundancy.

18. (Amended) The telecommunication system according to claim 17, wherein said data traffic units comprise at least one interface card.

19. (Amended) The telecommunication system according to claim 17, wherein said clock handling units comprise at least one interface card.

20. (Amended) The telecommunication system according to claim 17, wherein said telecommunication system is an ATM telecommunication system.

21. (Amended) The telecommunication system according to claim 20, wherein said clock handling units comprise at least one clock generator.

22. (Amended) The telecommunication system according to claim 17, wherein at least one of said mechanisms for establishing a redundancy is configured to access a central data bank.

23. (Amended) The telecommunication system according to claim 17, wherein at least one of said mechanisms for establishing a redundancy is configured to access a local data bank.

24. (Amended) The telecommunication system according to claim 17, wherein at least one of said mechanisms for establishing a redundancy comprises a mechanism for determining a redundancy.

25. (Amended) The telecommunication system according to claim 24, wherein at least one of said mechanisms for establishing a redundancy is software-controlled.

26. (Amended) The telecommunication system according to claim 17, wherein at least one of said mechanisms for establishing a redundancy are fashioned such that they set said redundancies hardware-controlled.

27. (Amended) The telecommunication system according to claim 17, wherein at least one of said mechanisms for establishing a redundancy further comprises a selector for selecting one of said redundant units.

28. (Amended) The telecommunication system according to claim 17, wherein said clock handling unit redundancy mechanism establishes a redundancy corresponding to a redundancy of the data traffic units.

29. (Amended) The telecommunication system according to claim 17, wherein at least one of said redundancies is a board redundancy.

30. (Amended) The telecommunication system according to claim 17, wherein at least one of said redundancies is a line redundancy.

31. (Amended) The telecommunication system according to claim 17, wherein at least one of said redundancies is a 1:N redundancy.

32. (Amended) The telecommunication system according to claim 31, wherein said 1:N redundancy is a 1:1 redundancy.

33. (Amended) The telecommunication system according to claim 17, wherein at least one of said redundancies is a 1+1 redundancy.

REMARKS

The present Amendment revises the specification and claims to conform to United States patent practice, before examination of the present PCT application in the United States National Examination Phase. Pursuant to 37 CFR 1.125 (b), applicants have concurrently submitted a substitute specification, excluding the claims, and provided a marked-up copy. All of the changes are editorial and applicant believes no new matter is added thereby. The amendment, addition, and/or cancellation of claims is not intended to be a surrender of any of the subject matter of those claims.

Early examination on the merits is respectfully requested.

Submitted by,

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Appendix A
Mark Ups for Claim Amendments

This redlined draft, generated by CompareRite (TM) - The Instant Redliner, shows the differences between -
original document : Q:\DOCUMENTS\YEAR 2001\P010085-HENNEN\ORIGINAL CLAIMS.DOC
and revised document: Q:\DOCUMENTS\YEAR 2001\P010085-HENNEN\AMENDED CLAIMS.DOC

CompareRite found 156 change(s) in the text

Deletions appear as Overstrike text surrounded by []
Additions appear as Bold-Underline text

1. [~~Method~~]**(Amended) A method** for operating a telecommunication system that contains data traffic units [~~(5)~~] and clock handling units [~~(1-4)~~] that can comprise both lines as well as assemblies, [~~whereby~~] **in which** at least [~~respectively~~] one part can be redundantly operated, [~~whereby the~~] **said** method [~~comprises~~] **comprising** the [~~following~~] steps **of**:

defining a redundancy [~~either for the~~] **for a defined redundancy entity, said defined redundancy entity being either** at least one part of [~~the~~] **said** data traffic [~~unit (5)~~] **units** or [~~for the~~] at least one part of [~~the~~] **said** clock handling units[~~(1-4), and~~]**;**

establishing [~~the~~] **said** defined redundancy for [~~the at least one part for which the~~] **said defined** redundancy [~~has been defined, characterized by the step:~~] **entity; and**

establishing a redundancy corresponding to [~~the~~] **said** defined redundancy for [~~the other~~] at least one **other** part [~~for~~] which [~~the redundancy has~~] **is** not [~~been~~] **said** defined **redundancy entity.**

2. (Amended) The method[~~.~~

~~2. Method~~] according to claim 1, [~~characterized in that the~~] **wherein said** telecommunication system is an ATM telecommunication system.

3. [~~Method~~]**(Amended) The method** according to claim 1 [~~or 2, characterized in that~~], **wherein** one of [~~the~~] **said** steps of establishing [~~contains a~~] **comprises the** step of writing at least one data bank[~~,~~] which can be a central or a local data bank.

4. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 3, characterized in that the~~] **claim 1, wherein said** step of establishing [~~a~~] **said** redundancy corresponding to the defined redundancy [~~contains~~] **comprises** a step of determining [~~the~~] **said** defined redundancy.

5. [~~Method~~]**(Amended) The method** according to claim 4, [~~characterized in that the~~] **wherein said** step of [~~determining the~~] **establishing said** defined redundancy is software-controlled.

6. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 5, characterized in that the~~] **claim 1 wherein said** step of establishing [~~the~~] **said** redundancy corresponding to [~~the~~] **said** defined redundancy sets this redundancy hardware-controlled.

7. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 6, characterized in that the method~~] **claim 1,** further [~~comprises a~~] **comprising the** step of selecting one of [~~the~~] redundant data traffic units and clock handling units.

8. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 7, characterized in that the~~] **claim 1, wherein said** step of defining [~~the~~] **said** redundancy ensues for at least a part of [~~the~~] **said** data traffic units and [~~the~~] **a** redundancy corresponding thereto is established for at least a part of [~~the~~] **said** clock handling units.

9. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 8, characterized in that~~] **claim 1, wherein** at least one of [~~the~~] **said** defined redundancies or redundancies corresponding thereto is a board redundancy.

10. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 9, characterized in that~~] **claim 1, wherein** at least one of [~~the~~] **said** defined redundancies or redundancies corresponding thereto is a line redundancy.

11. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 10, characterized in that~~] **claim 1, wherein** at least one of [~~the~~] **said** defined redundancies or redundancies corresponding thereto is a 1:N redundancy.

12. [~~Method~~]**(Amended) The method** according to claim 11, [~~characterized in that the~~] **wherein said** 1:N redundancy is a 1:1 redundancy.

13. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 12, characterized in that~~] **claim 1, wherein** at least one of [~~the~~] **said** defined redundancies or redundancies corresponding thereto is a 1+1 redundancy.

14. [~~Method~~]**(Amended) The method** according to [~~one of the claims 1 through 13, characterized in that~~] **claim 1, further comprising the step of providing at least one interface card which is a part of** at least one part of [~~the~~] **said** data traffic units [~~comprises~~]**.**

15. (Amended) The method according to claim 1, further comprising the step of providing at least one interface card **which is a part of** [~~(5).~~

~~15. Method according to one of the claims 1 through 14, characterized in that the~~] at least one part of [~~the~~] **said** clock handling units [~~comprises at least one interface card (5).~~]**.**

[16. Method] **16. (Amended) The method** according to [one of the claims 1 through 15, characterized in that the]**claim 1, further comprising the step of providing a clock generator which is a part of** at least one part of [the] **said** clock handling units [comprises a clock generator (1-4).]**.**

[17. Telecommunication] **17. (Amended) A telecommunication** system, comprising:

data traffic units [(5) for the implementation of a] **for implementing** data traffic, [whereby the] **said** data traffic units [can comprise] **capable of comprising** lines and assemblies and [can be] **capable of being** redundantly operated[,]**;**

clock handling units [(1-4)] for clock handling, [whereby the] **said** clock handling units [can comprise] **capable of comprising** lines and assemblies and [can be] **capable of being** redundantly operated[,]**;**

[means] **a data traffic unit redundancy mechanism** for establishing a redundancy of at least one part of [the] **said** data traffic units[(5), and]**; and**

[means] **a clock handling unit redundancy mechanism** for establishing a redundancy of at least one part of [the] **said** clock handling units[(1-4),]**;**

[characterized in that the means for establishing are] **said data traffic unit redundancy mechanism and said clock handling unit redundancy mechanism being** connected to one another such that [the] **they** enable [the] establishing [of] the redundancy of one of [the means] **said mechanisms** for establishing by transferring the redundancy of the other [means] **mechanism** for establishing **a redundancy.**

18. (Amended) The telecommunication[.

18. Telecommunication] system according to claim 17, [characterized in that the] **wherein said** data traffic units comprise at least one interface card[(5).]**.**

[~~19. Telecommunication~~] **19. (Amended) The telecommunication** system according to claim 17 [~~or 18, characterized in that the~~]**, wherein said** clock handling units comprise at least one interface card[~~(5).~~]**.**

[~~20. Telecommunication~~] **20. (Amended) The telecommunication system** according to [~~one of the claims 17 through 19, characterized in that the~~] **claim 17, wherein said** telecommunication system is an ATM telecommunication system.

21. [~~Telecommunication~~]**(Amended) The telecommunication** system according to claim 20, [~~characterized in that the~~] **wherein said** clock handling units comprise at least one clock generator[~~(1-4).~~]**.**

[~~22. Telecommunication~~] **22. (Amended) The telecommunication system** according to [~~one of the claims 17 through 21, characterized in that~~] **claim 17, wherein** at least one of [~~the means~~] **said mechanisms** for establishing [~~is fashioned such that it has~~] **a redundancy is configured to** access [~~to~~] a central data bank.

23. [~~Telecommunication~~]**(Amended) The telecommunication** system according to [~~one of the claims 17 through 22, characterized in that~~] **claim 17, wherein** at least one of [~~the means~~] **said mechanisms** for establishing [~~is fashioned such that it has~~] **a redundancy is configured to** access [~~to~~] a local data bank.

24. [~~Telecommunication~~]**(Amended) The telecommunication** system according to [~~one of the claims 17 through 23, characterized in that~~] **claim 17, wherein** at least one of [~~the means~~] **said mechanisms** for establishing **a redundancy** comprises [~~means~~] **a mechanism** for determining a redundancy.

25. [~~Telecommunication~~]**(Amended) The telecommunication** system according to claim 24, [~~characterized in that the means~~] **wherein at least one of said mechanisms** for establishing [~~are~~] **a redundancy is** software-controlled.

26. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 25, characterized in that the means]~~ **claim 17, wherein at least one of said mechanisms** for establishing **a redundancy** are fashioned such that they set ~~[the]~~ **said** redundancies hardware-controlled.

27. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 26, characterized in that the means]~~ **claim 17, wherein at least one of said mechanisms** for establishing ~~[comprise means]~~ **a redundancy further comprises a selector** for selecting one of ~~[the]~~ **said** redundant units.

28. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 27, characterized in that the means for establishing the redundancy of at least one part of the]~~ **claim 17, wherein said** clock handling ~~[units establish]~~ **unit redundancy mechanism establishes** a redundancy corresponding to ~~[the]~~ **a** redundancy of the data traffic units.

29. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 28, characterized in that]~~ **claim 17, wherein** at least one of ~~[the]~~ **said** redundancies is a board redundancy.

30. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 29, characterized in that]~~ **claim 17, wherein** at least one of ~~[the]~~ **said** redundancies is a line redundancy.

31. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 30, characterized in that]~~ **claim 17, wherein** at least one of ~~[the]~~ **said** redundancies is a 1:N redundancy.

32. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to claim 31, ~~[characterized in that the]~~ **wherein said** 1:N redundancy is a 1:1 redundancy.

33. ~~[Telecommunication]~~**(Amended) The telecommunication** system according to ~~[one of the claims 17 through 32, characterized in that]~~ **claim 17, wherein** at least one of ~~[the]~~ **said** redundancies is a 1+1 redundancy.

SPECIFICATION

TITLE

TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR ITS OPERATION

BACKGROUND OF THE INVENTION

Field of the Invention

1 The invention is directed to a method for the operation of a telecommunication system having data traffic units and clock handling units in which at least one part can be redundantly operated as well as to an appertaining telecommunication system. In particular, the invention is directed to a telecommunication system and a corresponding method in which existing redundancies of data traffic units and clock handling units are advantageously established.

Description of the Related Art

2 The term telecommunication is a collective designation for all message-oriented transmission methods with variously configured services in the communication over greater distances between man-man, man-machine and machine-machine. Telecommunication is receiving a rather particular significance due to the merging of information and communication technology.

Telecommunication is characterized by the transmission technology with cable transmission technology, voice and data radio, satellite technology, light waveguide technology, modems, digital searching systems and switching technology and local networks.

3 In order to enable a meaningful message exchange between two (or more) partners, a controller is required in addition to the mere transmission of messages, this controller defining conventions in the form of protocols that must be adhered to for a meaningful communication. Such rules are described in, for example, the service specifications of the individual levels of the OSI reference model (Open Systems Interconnection). The OSI reference model was produced in the year 1983

by the International Standardization Organization (ISO) proceeding from the transmission of information in the sector of data processing and has become extremely wide-spread in the meantime, in applications of communication systems as well. The OSI model merely represents principles of the message transmission and consequently only defines the logic of the information flow between subscribers. Since the OSI standard contains no definitions about the physical transmission of communication, it is manufacturer-independent but needs supplementary protocols for the realization of a communication system for a more detailed definition based on other (e.g., proprietary) standards.

4 Fundamentally, a distinction can be made between asynchronous and synchronous communication. What is generally understood by "asynchronous communication" is the exchange of messages between a transmission entity and a reception entity that is completely decoupled in terms of time. It cannot be predicted when a transmission operation and the appertaining reception operation will be initiated.

5 In contrast, what is understood by "synchronous communication" is the exchange of messages between a transmission entity and a reception entity when this exchange occurs in a fixed time grid. A transmission operation and the appertaining reception operation must thereby always be isochronically implemented.

6 Telecommunication networks are characterized by the possibility of bidirectional and multi-directional data exchange between the subscribers. This assumes that each participating subscriber can communicate with every other subscriber via the same medium. The simplest realization of this is communication of all subscribers in the base band. Due to the multitude of subscribers where active in parallel, it is mainly methods that statically allocate the available bandwidth to the subscribers in time-division multiplex that are utilized in this situation.

7 Due to the increase in use of light waveguide technology and the necessity of an improved intercontinental data communication and the higher performance demands, the plesiochronic digital hierarchy (PDH) that has prevailed since the 1960's is being increasingly replaced by the synchronous digital hierarchy (SDH).

The International Standard SDH enacted by the International Telecommunications Union (ITU) resulted from the American Standard SONET (Synchronous Optical Network), the standard that was developed by Bellcore in the USA and approved by the Industrial Carrier Compatibility Form (ICCF) in 1984.

8 Traditional telecommunication structures are based on time-division multiplex methods (TDM, time division multiplex). In contrast, ATM (asynchronous transfer mode) only sends data when its transfer is required, i.e., frames are asynchronously transmitted. The initial recommendations for ATM were published in the years 1990/91 and both the ITU as well as the ATM forum established in September 1991 have been concerned with the standardization of ATM.

9 Like other transmission methods, ATM is fundamentally based on a packet transmission technology. Similar to the OSI reference model, ATM is also vertically divided into several layers. Over and above this, a horizontal classification is undertaken according to aspects of the data exchange between users, aspects of the communication control and management aspects. A mapping of the individual ATM layers onto the layers of the OSI reference model is not possible without further effort since the functions of the ATM layers are partly distributed over different OSI layers. In OSI terminology, ATM would be resident on the bit transmission level but also offers some additional functions of the security level.

10 For the transmission, ATM only uses packets having a fixed length of 53 bytes. This rigid transmission unit is referred to as an ATM cell and is composed of a header that is five bytes long as well as of 48 bytes of payload information (payload). UNI cells are distinguished from NNI cells dependent on the occupancy of the bits 5-8 of the first header byte.

11 In order to enable a step-by-step introduction of the ATM transmission method both in long-distance networks as well as in local networks, ATM is not bound to a specific transmission medium. The physical layer is therefore divided into a media-dependent sub-layer (PM) and a sub-layer (TC) that is independent of the transmission medium. The transmission of a cell thereby occurs in a continuous cell stream. A fixed allocation between virtual ATM channels and time slots of the medium does not exist. On the contrary, a plurality of time slots are dynamically

allocated to each virtual channel in succession dependent on the required bandwidth. The asynchronism in ATM is therefore not comprised in a time-asynchronous access onto the transmission medium but in the dynamic assigning of the bandwidth useable for a virtual channel on the basis of the plurality of required time slots.

12 The direct transmission of ATM cells is the most efficient, since an additional overhead due to the adaptation to the transmission frame of the medium is eliminated, and instead, the cell stream is directly transmitted bit-by-bit. The critical disadvantage of direct cell transmission is that there is an incapability with previous transmission methods in long-distance networks, since the infrastructure of these networks is based mainly on PDH and SDH systems.

13 The transmission via SDH is based on the nesting of a plurality of ATM cells in the synchronous transport modules of the SDH hierarchy. The transmission of ATM cells via SDH has previously been specified for SDH transmission rates of 155 Mbps and 622 Mbps (STM-1 and STM-4). Additionally, the use of the STM-16 hierarchy level with 2.5 Gbps is also provided.

14 Like an ATM transmission via SDH, the use of existing of PDH networks is also provided by the ITU. An ATM transmission via PDH hierarchy levels was standardized between 1.5 Mbps and 139 Mbps.

15 In telecommunication systems, circuits that are provided for the transmission, interpretation, formatting, handling and processing of payload and supplemental data are fundamentally distinguished from circuits that serve for the reception, the generation, modification, synchronization and forwarding of clock signals.

16 Telecommunication systems that have a connection to standardized transmission networks like PDH, SDH or SONET usually require a synchronization in order to achieve the necessary quality at the interface to the transmission network. Two operating modes of such synchronization are distinguished. In the case of an external synchronization, a clock is directly supplied to the system from an external synchronization. In contrast, in a synchronization via the transmission path, the clock is acquired from the received data stream of the interface and supplied to the system as a synchronization source. To this end, the received data frames also

include supplemental information that describe the quality of the clock signal of a collaborating party, containing this in addition to the payload information.

17 The clock quality is transmitted in timing marker bits in some interface types in plesiochronic digital hierarchy. In the case of SONET and the synchronous digital hierarchy, the quality of the clock signal is communicated in the "SSM byte" (synchronization status message).

18 Since the clock quality of a clock source with which the telecommunication system is synchronized can be variable and a reference clock can also drop out, at least two reference clocks that are redundant relative to one another are employed for synchronization of telecommunication systems. The drop-out of a reference clock must be recognized by the telecommunication and a switch must then be automatically made to the redundant reference clock.

19 In order to assure error-free data transmission in a telecommunication system, telecommunication systems exhibit redundancies both in the data traffic as well as in the clock handling. Fundamentally, a line redundancy and a board redundancy must be distinguished. For line redundancy, a line that is redundant relative to one line is established; for board redundancy, assemblies that are redundant relative to one another are present.

20 A distinction is made between 1+1, 1:1 and 1:N redundancies both in line redundancy as well as in board redundancy. Given 1+1 redundancy, both units that are redundant relative to one another (lines, assemblies) have the same information in an error-free condition. One of these units is selected as an active unit, and the other is on hand in a "hot standby" mode.

21 Given 1:1 redundancy, the two units that are redundant relative to one another carry non-identical information in an error-free condition. A determination is made as to which of the redundant units transmits or processes information having a priority that is higher than the other unit. In case of error of the unit having the higher priority, the operation of the lower-priority unit is interrupted so that the transmission or processing of the more important information can be continued. Given 1:N redundancy, one low-priority unit serves N other units.

22 When a data traffic unit such as an interface card 5 (Figure) is newly configured, then the operator recites the redundancies that are desired in the telecommunication system. These redundancies are then established with software-controlled or hardware-controlled switches. Additionally, the information about the redundancies that have been established are maintained in data banks.

23 To this end, the telecommunication system has a central data bank available to it in which data relating to each and every individual reference clock are also maintained in addition to information about the status of individual assemblies, alarm messages about failed units, and the plurality of reference clocks. These clock-specific data comprise the specification of the interface card from which the reference clock and the payload data are taken, the priority, the current quality, and the availability of the reference clock as well as alarm messages regarding reference clocks that have dropped out.

24 In addition to the central data bank, the telecommunication system also has decentralized (local) data banks available to it to which the individual units have access. These decentralized data banks are images of the central data bank but only contain those data that are required for the respective unit. When data in the central data bank are modified, the telecommunication system also updates the decentralized data banks.

25 Such a modification of the central data bank ensues, for example, when a peripheral processor platform (an interface card, a clock generator) or some other unit fails, the quality of a reference clock changes or a new reference clock is established.

26 In traditional telecommunication systems, the operator specifies the requested redundancy both for the data traffic as well as for the clock handling upon establishment of a data traffic unit such as an interface card 5.

27 This has the disadvantage that settings are also possible where only the data traffic but not the clock handling is secured due to the presence of redundant units. Given an outage or a reduction in quality of the clock signals, a data traffic may become faulty due to the shifting of clock frequencies even though redundancies had been established.

SUMMARY OF THE INVENTION

28 The invention is thus based on the object providing a method for operating a telecommunication system as well as a telecommunication system having enhanced operating dependability.

29 This object is achieved by a method for operating a telecommunication system that contains data traffic units and clock handling units that can comprise both lines as well as assemblies, in which at least one part can be redundantly operated, the method comprising the steps of: defining a redundancy for a defined redundancy entity, the defined redundancy entity being either at least one part of the data traffic units or at least one part of the clock handling units; establishing the defined redundancy for the defined redundancy entity; and establishing a redundancy corresponding to the defined redundancy for at least one other part which is not the defined redundancy entity.

30 This object is also achieved by a telecommunication system, comprising: data traffic units for implementing data traffic, the data traffic units capable of comprising lines and assemblies and capable of being redundantly operated; clock handling units for clock handling, the clock handling units capable of comprising lines and assemblies and capable of being redundantly operated; a data traffic unit redundancy mechanism for establishing a redundancy of at least one part of the data traffic units; and a clock handling unit redundancy mechanism for establishing a redundancy of at least one part of the clock handling units; the data traffic unit redundancy mechanism and the clock handling unit redundancy mechanism being connected to one another such that they enable establishing the redundancy of one of the mechanisms for establishing by transferring the redundancy of the other mechanism for establishing a redundancy.

31 Advantageous developments of the invention are as follows. The telecommunication system may be an ATM telecommunication system. One of the steps of establishing may comprise the step of writing at least one data bank which can be a central or a local data bank. The step of establishing the redundancy corresponding to the defined redundancy may comprise a step of determining the

defined redundancy. The step of establishing the defined redundancy may be software-controlled. The step of establishing the redundancy corresponding to the defined redundancy may set this redundancy hardware-controlled. The inventive method may further comprise the step of selecting one of redundant data traffic units and clock handling units. The step of defining the redundancy may ensue for at least a part of the data traffic units and a redundancy corresponding thereto is established for at least a part of the clock handling units. At least one of the defined redundancies or redundancies corresponding thereto may be a board redundancy or a line redundancy. At least one of the defined redundancies or redundancies corresponding thereto may be a 1:N redundancy, which includes a 1:1 redundancy. At least one of the defined redundancies or redundancies corresponding thereto may be a 1+1 redundancy. At least one interface card may be provided which is a part of at least one part of the data traffic units, or an interface card may be provided which is a part of at least one part of the clock handling units. Finally, a clock generator may be provided which is a part of at least one part of the clock handling units. These inventive aspects are explained in greater detail below or have been described above.

32 The invention particularly provides that, upon establishment of redundant units (lines, assemblies), redundancies relating both to the data traffic as well as to the clock handling are always established, resulting in avoidance of sources of error and providing an enhanced failure dependability.

33 Furthermore, the invention advantageously creates a method for operating a telecommunication system as well as a telecommunication system in which the operator need not indicate an associated redundancy upon establishment of the reference clock, resulting in a reduction of the work outlay. Additionally, all information about established redundancies are present at the earliest possible point in time via central and decentralized data banks.

BRIEF DESCRIPTION OF THE DRAWINGS

34 Preferred exemplary embodiments of the invention are explained in below with reference to the sole Figure.

Fig. a block schematic diagram providing overview of clock handling units of an ATM node.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

35 The lines, interface cards/data traffic units 5, and clock generators 3, 4 (which are a part of the clock handling units 1-4) shown in the Fig. can be redundantly operated. Additionally, further clock handling units can comprise redundancies. Finally, the data traffic units and lines (which are not shown in the Fig.) also comprise redundancies.

36 According to the preferred exemplary embodiment, the operator of the telecommunication system establishes a 1+1, 1:N or 1:1 redundancy of a line or of an assembly that serves the purpose of data traffic. This redundancy is deposited in a data bank. Subsequently, the redundancy of the data traffic is automatically determined with a software control and applied to the clock handling. To that end, a corresponding redundancy of the clock handling devices is set under hardware control. Subsequently, the redundant units (lines, assemblies) that have been set are established and one of the redundant units is selected for active operation. Queries of the local data bank will preferably ensue for this purpose.

37 The inventive method is preferably applied in an inventive telecommunication system for establishing a clock source that comprises a 1+1 line redundancy.

38 The above-described method and telecommunication system are illustrative of the principles of the present invention. Numerous modifications and adaptations will be readily apparent to those skilled in this art without departing from the spirit and scope of the present invention.

ABSTRACT

39 For protecting the data traffic, telecommunication systems comprise redundancies in assemblies or lines of data traffic units and clock handling units. When establishing units such as clock sources, the redundancy of the data traffic and of the clock handling must be separately indicated. This can lead to a situation in which only the data traffic is redundant but not the clock handling. The invention enhances the operational dependability of the telecommunication system. First, a redundancy is defined and established either for a part of the data traffic units or a part of the clock handling units. A redundancy corresponding to the defined redundancy is then likewise established for the other part. The inventive telecommunication system comprises a mechanism for establishing a data traffic redundancy and a mechanism for establishing a clock redundancy that are connected to one another.

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SPECIFICATION

TITLE

TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR ~~[THE]~~ **ITS** OPERATION ~~[THEREOF~~

BACKGROUND OF THE INVENTION

Field of the Invention

1 The invention is directed to a method for the operation of a telecommunication system ~~[according to the preamble of patent claim 1 and is also directed to a]~~ **having data traffic units and clock handling units in which at least one part can be redundantly operated as well as to an appertaining** telecommunication system ~~[according to the preamble of patent claim 15]~~. In particular, the invention is directed to a telecommunication system and a corresponding method ~~[wherein]~~ **in which** existing redundancies of data traffic units and clock handling units are advantageously established.

Description of the Related Art

2 The term telecommunication is a collective designation for all message-oriented transmission methods with variously configured services in the communication over greater distances between man-man, man-machine and machine-machine. Telecommunication is receiving a rather particular significance due to the merging of information and communication technology. Telecommunication is characterized by the transmission technology with cable transmission technology, voice and data radio, satellite technology, light waveguide technology, modems, digital searching systems and switching technology and local networks.

3 In order to enable a meaningful message exchange between two (or more) partners, a controller is required in addition to the mere transmission of messages, ~~[said]~~ **this** controller defining conventions in the form of protocols that must be adhered to for a meaningful communication. Such rules are **described in**, for example, ~~[described in]~~ the service specifications of the individual levels of the OSI reference model (Open Systems Interconnection). The OSI reference model was produced in the year 1983 by the International Standardization Organization (ISO) proceeding from the transmission of information in the sector of data processing and has become extremely wide-spread

in the meantime, in applications of communication systems as well. The OSI model merely represents principles of the message transmission and consequently only defines the logic of the information flow between subscribers. Since the OSI standard contains no definitions about the physical transmission of communication, it is manufacturer-independent but needs supplementary protocols for the realization of a communication system for a more detailed definition based on other[, ~~for example proprietary,~~] **(e.g., proprietary)** standards.

4 Fundamentally, a distinction can be made between asynchronous and synchronous communication. What is generally understood by ~~[asynchronous communication]~~**"asynchronous communication"** is the exchange of messages between a transmission entity and a reception entity that is completely decoupled in terms of time. It cannot be predicted when a transmission operation and the appertaining reception operation will be initiated.

~~[Compared thereto]~~ **5** **In contrast**, what is understood by ~~[synchronous communication]~~**"synchronous communication"** is the exchange of messages between a transmission entity and a reception entity when this exchange occurs in a fixed time grid. A transmission operation and the appertaining reception operation must thereby always be isochronically implemented.

6 Telecommunication networks are characterized by the possibility of bidirectional and multi-directional data exchange between the subscribers. This assumes that each participating subscriber can communicate with every other subscriber via the same medium. The simplest realization of this is communication of all subscribers in the base band. Due to the multitude of subscribers where active in parallel, it is mainly methods that statically allocate the available bandwidth to the subscribers in time-division multiplex that are utilized ~~[here.~~ **]in this situation.**

7 Due to the increase in use of light waveguide technology[~~,~~] **and** the necessity of an improved intercontinental data communication and the higher performance demands, the plesiochronic digital hierarchy (PDH) that has prevailed since the 1960's is being increasingly replaced by the synchronous digital hierarchy (SDH). The International Standard SDH enacted by the International Telecommunications Union (ITU) resulted from the American Standard SONET (Synchronous Optical Network), the standard that was developed by Bellcore in the USA and approved by the Industrial Carrier Compatibility Form (ICCF) in 1984.

8 Traditional telecommunication structures are based on time-division multiplex methods (TDM, time division multiplex). ~~[Compared thereto]~~ **In contrast**, ATM (asynchronous transfer mode) only sends data when ~~[this]~~ **its transfer** is required, i.e., frames are asynchronously transmitted. The initial recommendations for ATM were published in the years 1990/91 and both the ITU as well as the ATM forum established in September 1991 have been concerned with the standardization of ATM.

9 Like other transmission methods, ATM is fundamentally based on a packet transmission technology. Similar to the OSI reference model, ATM is also vertically divided into several layers. Over and above this, a horizontal classification is undertaken according to aspects of the data exchange between users, aspects of the communication control and management aspects. A mapping of the individual ATM layers onto the layers of the OSI reference model is not possible

without further [~~ado~~] **effort** since the functions of the ATM layers are partly distributed over different OSI layers. In OSI terminology, ATM would be resident on the bit transmission level but also offers some **additional** functions of the security level [~~over and above this.~~

].

10 For the transmission, ATM only uses packets having a fixed length of 53 bytes. This rigid transmission unit is referred to as **an** ATM cell and is composed of a header that is five bytes long as well as of 48 bytes of payload information (payload). UNI cells are distinguished from NNI cells dependent on the occupancy of the bits 5-8 of the first header byte.

11 In order to enable a step-by-step introduction of the ATM transmission method both in long-distance networks as well as in local networks, ATM is not bound to a specific transmission medium. The physical layer is therefore divided into a media-dependent sub-layer (PM) and a sub-layer (TC) that is independent of the transmission medium. The transmission of a cell thereby occurs in a continuous cell stream. A fixed allocation between virtual ATM channels and time slots of the medium does not exist. On the contrary, a plurality of time slots are dynamically allocated to each virtual channel in succession dependent on the required bandwidth. The asynchronism in ATM is therefore not comprised in a time-asynchronous access onto the transmission medium but in the dynamic assigning of the bandwidth useable for a virtual channel on the basis of the plurality of required time slots.

12 The direct transmission of ATM cells is the most efficient, since an additional overhead due to the adaptation to the transmission frame of the medium is eliminated, **and** instead, the cell stream is directly transmitted bit-by-bit. The critical disadvantage of direct cell transmission is [~~thereby comprised in the~~] **that there is an** incapability with previous transmission methods in long-distance networks, since the infrastructure of these networks is based mainly on PDH and SDH systems.

13 The transmission via SDH is based on the nesting of a plurality of ATM cells in the synchronous transport modules of the SDH hierarchy. The transmission of ATM cells via SDH has [~~hitherto~~] **previously** been specified for SDH transmission rates of 155 Mbps and 622 Mbps (STM-1 and STM-4). [~~Over and above this~~] **Additionally**, the use of the STM-16 hierarchy level with 2.5 Gbps is also provided.

14 Like an ATM transmission via SDH, the use of existing of PDH networks is also provided by the ITU. An ATM transmission via PDH hierarchy levels was standardized between 1.5 Mbps and 139 Mbps.

15 In telecommunication systems, circuits that are provided for the transmission, interpretation, formatting, handling and processing of payload and supplemental data are [~~to be~~] fundamentally distinguished from circuits that serve for the reception, the generation, modification, synchronization and forwarding of clock signals.

16 Telecommunication systems **that** have [~~the~~] **a** connection to standardized transmission networks like PDH, SDH or SONET usually require a synchronization in order to achieve the necessary quality at the interface to the transmission network. Two operating modes of [~~the~~] **such** synchronization are [~~thereby~~] distinguished. In the case of an external synchronization, a clock is directly supplied to the system from an external synchronization. [~~Compared thereto~~] **In contrast,** in a

synchronization via the transmission path, the clock is acquired from the received data stream of the interface and supplied to the system as **a** synchronization source. To this end, the received data frames also include supplemental information that describe the quality of the clock signal of a collaborating party, containing this in addition to the payload information.

17 The clock quality is transmitted in timing marker bits in some interface types in plesiochronic digital hierarchy. In the case of SONET and the synchronous digital hierarchy, the quality of the clock signal is communicated in ~~[what is referred to as the SSM byte]~~ **the "SSM byte"** (synchronization status message).

18 Since the clock quality of a clock source with which the telecommunication system is synchronized can be variable and a reference clock can also drop out, at least two reference clocks that are redundant relative to one another are employed for synchronization of telecommunication systems. The drop-out of a reference clock must ~~[thereby]~~ be recognized by the telecommunication and a switch must then be automatically made to the redundant reference clock.

19 In order to assure error-free data transmission in a telecommunication system, telecommunication systems exhibit redundancies both in the data traffic as well as in the clock handling. Fundamentally, ~~[the]~~ **a** line redundancy and ~~[the]~~ **a** board redundancy must be distinguished. ~~[Given the]~~ **For** line redundancy, a line that is redundant relative to one line is established~~[. In]~~**; for** board redundancy, assemblies that are redundant relative to one another are present.

20 A distinction ~~[must be]~~ **is** made between 1+1, 1:1 and 1:N redundancies both in line redundancy as well as in board redundancy. Given 1+1 redundancy, both units that are redundant relative to one another (lines, assemblies) have the same information in ~~[the]~~ **an** error-free condition. One of ~~[the]~~ **these** units is ~~[thereby]~~ selected as **an** active ~~[units, whereas]~~ **unit, and** the other is on hand ~~[("hot standby").~~

~~]~~**in a "hot standby" mode.**

21 Given 1:1 redundancy, the two units that are redundant relative to one another carry ~~[a]~~ non-identical information in ~~[the]~~ **an** error-free condition. A determination is ~~[thereby]~~ made as to which of the redundant units transmits or~~[, respectively,]~~ processes information having a priority that is higher than the other unit. In case of error of the unit having the higher priority, the operation of the lower-priority unit is interrupted so that the transmission or~~[, respectively,]~~ processing of the more important information can be continued. Given 1:N redundancy, one low-priority unit serves N other units.

22 When a **data traffic** unit such as~~[, for example,]~~ an interface card 5~~[,]~~ **(Figure)** is newly configured, then the operator recites the redundancies that are desired in the telecommunication system. These redundancies are then established with software-controlled or hardware-controlled ~~[switch means. Over and above this]~~ **switches. Additionally**, the information about the redundancies that have been established are maintained in data banks.

23 To this end, the telecommunication system has a central data bank available to it ~~[wherein]~~ **in which** data relating to each and every individual reference clock are also maintained in addition to information about the status of individual assemblies, alarm messages about failed units, and the plurality of reference clocks. These clock-specific data comprise the specification of the interface card

from which the reference clock and the payload data are taken, the priority, the current quality, and the availability of the reference clock as well as alarm messages regarding reference clocks that have dropped out.

24 In addition to the central data bank, the telecommunication system also has decentralized (local) data banks available to it to which the individual units have access. These decentralized data banks are images of the central data bank but only contain those data that are required for the respective unit. When data in the central data bank are modified, the telecommunication system also updates the decentralized data banks.

25 Such a modification of the central data bank ensues, for example, when a peripheral processor platform (an interface card, a clock generator) or some other unit fails, the quality of a reference clock changes or a new reference clock is established.

26 In traditional telecommunication systems, the operator specifies the requested redundancy both for the data traffic as well as for the clock handling upon establishment of a **data traffic** unit such as~~[, for example,]~~ an interface card 5.

27 This has the disadvantage that settings are also possible ~~[wherein]~~ **where** only the data traffic but not the clock handling is secured due to the presence of redundant units. ~~[The case can thereby occur that, given]~~ **Given** an outage or a reduction in quality of the clock signals, a data traffic ~~[becomes]~~ **may become** faulty due to the shifting of clock frequencies even though redundancies had been established.

SUMMARY OF THE INVENTION

28 The invention is thus based on the object ~~[of specifying]~~ **providing** a method for operating a telecommunication system as well as a telecommunication system having enhanced operating dependability.

29 This object is achieved by ~~[the subject matters of patent claims 1 and 17.~~ **]a method for operating a telecommunication system that contains data traffic units and clock handling units that can comprise both lines as well as assemblies, in which at least one part can be redundantly operated, the method comprising the steps of: defining a redundancy for a defined redundancy entity, the defined redundancy entity being either at least one part of the data traffic units or at least one part of the clock handling units; establishing the defined redundancy for the defined redundancy entity; and establishing a redundancy corresponding to the defined redundancy for at least one other part which is not the defined redundancy entity.**

30 This object is also achieved by a telecommunication system, comprising: data traffic units for implementing data traffic, the data traffic units capable of comprising lines and assemblies and capable of being redundantly operated; clock handling units for clock handling, the clock handling units capable of comprising lines and assemblies and capable of being redundantly operated; a data traffic unit redundancy mechanism for establishing a redundancy of at least one part of the data traffic units; and a clock handling unit redundancy mechanism for establishing a redundancy of at least one part of the clock handling units; the

data traffic unit redundancy mechanism and the clock handling unit redundancy mechanism being connected to one another such that they enable establishing the redundancy of one of the mechanisms for establishing by transferring the redundancy of the other mechanism for establishing a redundancy.

31 Advantageous developments of the invention are ~~[the subject matters of the subclaims.]~~ **as follows. The telecommunication system may be an ATM telecommunication system. One of the steps of establishing may comprise the step of writing at least one data bank which can be a central or a local data bank. The step of establishing the redundancy corresponding to the defined redundancy may comprise a step of determining the defined redundancy. The step of establishing the defined redundancy may be software-controlled. The step of establishing the redundancy corresponding to the defined redundancy may set this redundancy hardware-controlled. The inventive method may further comprise the step of selecting one of redundant data traffic units and clock handling units. The step of defining the redundancy may ensue for at least a part of the data traffic units and a redundancy corresponding thereto is established for at least a part of the clock handling units. At least one of the defined redundancies or redundancies corresponding thereto may be a board redundancy or a line redundancy. At least one of the defined redundancies or redundancies corresponding thereto may be a 1:N redundancy, which includes a 1:1 redundancy. At least one of the defined redundancies or redundancies corresponding thereto may be a 1+1 redundancy. At least one interface card may be provided which is a part of at least one part of the data traffic units, or an interface card may be provided which is a part of at least one part of the clock handling units. Finally, a clock generator may be provided which is a part of at least one part of the clock handling units. These inventive aspects are explained in greater detail below or have been described above.**

~~[What is particularly achieved with the invention is]~~ **32** **The invention particularly provides** that, upon establishment of redundant units (lines, assemblies), redundancies relating both to the data traffic as well as to the clock handling are always established~~[. As a result thereof,]~~**, resulting in avoidance of** sources of error ~~[are avoided and]~~**and providing** an enhanced failure dependability ~~[is achieved.]~~.

~~[Further]~~ **33** **Furthermore**, the invention advantageously creates a method for operating a telecommunication system as well as a telecommunication system ~~[wherein]~~ **in which** the operator need not indicate ~~[the]~~ **an associated** redundancy ~~[thereof]~~ upon establishment of the reference clock~~[. This leading to]~~**, resulting in** a reduction of the work outlay. ~~[Over and above this]~~ **Additionally**, all information about established redundancies are present at the earliest possible point in time via central and decentralized data banks.

BRIEF DESCRIPTION OF THE DRAWINGS

34 Preferred exemplary embodiments of the invention are explained in below~~[. Shown are: Fig. 1 an]~~ **with reference to the sole Figure.**

Fig. **a block schematic diagram providing** overview of clock handling units of an ATM node.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

35 The lines, interface ~~[cards 5]~~**cards/data traffic units 5,** and clock generators 3, 4 **(which are a part of the clock handling units 1-4)** shown in **the** Fig. ~~[1]~~ can be redundantly operated. ~~[Over and above this]~~ **Additionally**, further clock handling units can comprise redundancies. Finally, the data traffic units and lines (which are not shown in ~~[Fig. 1)]~~ **the Fig.)** also comprise redundancies.

36 According to the preferred exemplary embodiment, the operator of the telecommunication system establishes a 1+1, 1:N or 1:1 redundancy of a line or of **an** assembly that serves the purpose of data traffic. This redundancy is deposited in a data bank. Subsequently, the redundancy of the data traffic is automatically determined with a software control and applied to the clock handling. To that end, a corresponding redundancy of the clock handling devices is set under hardware control. Subsequently, the redundant units (lines, assemblies) that have been set are established and one of the redundant units is selected for active operation. Queries of the local data bank will preferably ensue for this purpose.

37 The inventive method is preferably applied in an inventive telecommunication system for establishing a clock source that comprises a 1+1 line redundancy.

~~[Abstract]~~ **38** **The above-described method and telecommunication system are illustrative of the principles of the present invention. Numerous modifications and adaptations will be readily apparent to those skilled in this art without departing from the spirit and scope of the present invention.**

~~[TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR THE OPERATION THEREOF]~~

ABSTRACT

39 For protecting the data traffic, telecommunication systems comprise redundancies in assemblies or lines of data traffic units and clock handling units. When establishing units such as clock sources, the redundancy of the data traffic and of the clock handling must be separately indicated. This can lead to a situation ~~[wherein]~~ **in which** only the data traffic is redundant but not the clock handling. The invention ~~[is intended to enhance]~~ **enhances** the operational dependability of the telecommunication system. First, a redundancy is defined and established either for a part of the data traffic units or a part of the clock handling units. A redundancy corresponding to the defined redundancy is then likewise established for the other part. The inventive telecommunication system comprises ~~[means]~~ **a mechanism** for establishing a data traffic redundancy and ~~[means]~~ **a mechanism** for establishing a clock redundancy that are connected to one another.
~~[Figure 1]~~

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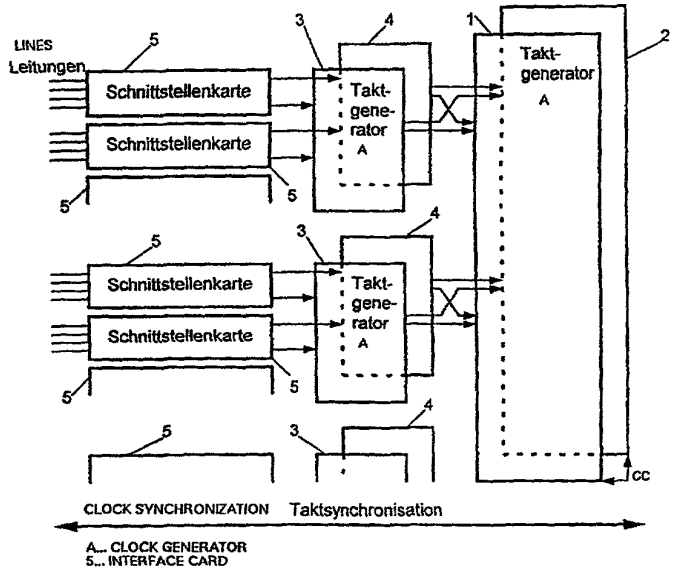
(54) Bezeichnung: TELEKOMMUNIKATIONSSYSTEM SOWIE VERFAHREN ZUM BETREIBEN DESSELBEN

(57) Abstract

Telecommunications systems comprise redundancies in subassemblies or lines from data traffic units and clock handling units in order to safeguard data traffic. When setting up units such as clock pulse sources, the redundancy of the data traffic and of the clock handling have to be separately specified. This can lead to a situation in which only the data traffic is redundant, but not the clock handling. The invention should increase the operational reliability of the telecommunications system. Firstly, a redundancy is determined and set up for either a portion of the data traffic units or for a portion of the clock handling units. One redundancy which corresponds to the determined redundancy is then likewise set up for the other portion. The inventive telecommunications system comprises means for setting up a data traffic redundancy and means for setting up a clock pulse redundancy which are interconnected.



(57) Zusammenfassung

Telekommunikationssysteme weisen zur Sicherung des Datenverkehrs Redundanzen in Baugruppen oder Leitungen von Datenverkehrseinheiten und Taktbehandlungseinheiten auf. Beim Einrichten von Einheiten wie Taktquellen müssen die Redundanz des Datenverkehrs und der Taktbehandlung getrennt angegeben werden. Dies kann zu einer Situation führen, in der lediglich der Datenverkehr redundant ist, nicht aber die Taktbehandlung. Die Erfindung soll die Betriebssicherheit des Telekommunikationssystems erhöhen. Zunächst wird eine Redundanz entweder für einen Teil der Datenverkehrseinheiten oder einen Teil der Taktbehandlungseinheiten festgelegt und eingerichtet. Eine der festgelegten Redundanz entsprechende Redundanz wird dann für den anderen Teil ebenfalls eingerichtet. Das erfindungsgemäße Telekommunikationssystem umfaßt Mittel zum Einrichten einer Datenverkehrsredundanz und Mittel zum Einrichten einer Taktredundanz, die miteinander verbunden sind.

TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR THE OPERATION THEREOF

The invention is directed to a method for the operation of a telecommunication system according to the preamble of patent claim 1 and is also directed to a telecommunication system according to the preamble of patent claim 15. In particular, the invention is directed to a telecommunication system and a corresponding method wherein existing redundancies of data traffic units and clock handling units are advantageously established.

The term telecommunication is a collective designation for all message-oriented transmission methods with variously configured services in the communication over greater distances between man-man, man-machine and machine-machine. Telecommunication is receiving a rather particular significance due to the merging of information and communication technology. Telecommunication is characterized by the transmission technology with cable transmission technology, voice and data radio, satellite technology, light waveguide technology, modems, digital searching systems and switching technology and local networks.

In order to enable a meaningful message exchange between two (or more) partners, a controller is required in addition to the mere transmission of messages, said controller defining conventions in the form of protocols that must be adhered to for a meaningful communication. Such rules are, for example, described in the service specifications of the individual levels of the OSI reference model (Open Systems Interconnection). The OSI reference model was produced in the year 1983 by the International Standardization Organization (ISO) proceeding from the transmission of information in the sector of data processing and has become extremely wide-spread in the meantime, in applications of communication systems as well. The OSI model merely represents principles of the message transmission and consequently only defines the logic of the information flow between subscribers. Since the OSI standard contains no definitions about the physical transmission of communication, it is manufacturer-independent but needs supplementary protocols for

the realization of a communication system for a more detailed definition based on other, for example proprietary, standards.

Fundamentally, a distinction can be made between asynchronous and synchronous communication. What is generally understood by asynchronous communication is the exchange of messages between a transmission entity and a reception entity that is completely decoupled in terms of time. It cannot be predicted when a transmission operation and the appertaining reception operation will be initiated.

Compared thereto, what is understood by synchronous communication is the exchange of messages between a transmission entity and a reception entity when this exchange occurs in a fixed time grid. A transmission operation and the appertaining reception operation must thereby always be isochronically implemented.

Telecommunication networks are characterized by the possibility of bidirectional and multi-directional data exchange between the subscribers. This assumes that each participating subscriber can communicate with every other subscriber via the same medium. The simplest realization of this is communication of all subscribers in the base band. Due to the multitude of subscribers where active in parallel, it is mainly methods that statically allocate the available bandwidth to the subscribers in time-division multiplex that are utilized here.

Due to the increase in use of light waveguide technology, the necessity of an improved intercontinental data communication and the higher performance demands, the plesiochronic digital hierarchy (PDH) that has prevailed since the 1960's is being increasingly replaced by the synchronous digital hierarchy (SDH). The International Standard SDH enacted by the International Telecommunications Union (ITU) resulted from the American Standard SONET (Synchronous Optical Network), the standard that was developed by Bellcore in the USA and approved by the Industrial Carrier Compatibility Form (ICCF) in 1984.

Traditional telecommunication structures are based on time-division multiplex methods (TDM, time division multiplex). Compared thereto, ATM (asynchronous transfer mode) only sends data when this is required, i.e. frames are asynchronously transmitted. The initial recommendations for ATM were published in

the years 1990/91 and both the ITU as well as the ATM forum established in September 1991 have been concerned with the standardization of ATM.

Like other transmission methods, ATM is fundamentally based on a packet transmission technology. Similar to the OSI reference model, ATM is also vertically divided into several layers. Over and above this, a horizontal classification is undertaken according to aspects of the data exchange between users, aspects of the communication control and management aspects. A mapping of the individual ATM layers onto the layers of the OSI reference model is not possible without further ado since the functions of the ATM layers are partly distributed over different OSI layers. In OSI terminology, ATM would be resident on the bit transmission level but also offers some functions of the security level over and above this.

For the transmission, ATM only uses packets having a fixed length of 53 bytes. This rigid transmission unit is referred to as ATM cell and is composed of a header that is five bytes long as well as of 48 bytes of payload information (payload). UNI cells are distinguished from NNI cells dependent on the occupancy of the bits 5-8 of the first header byte.

In order to enable a step-by-step introduction of the ATM transmission method both in long-distance networks as well as in local networks, ATM is not bound to a specific transmission medium. The physical layer is therefore divided into a media-dependent sub-layer (PM) and a sub-layer (TC) that is independent of the transmission medium. The transmission of a cell thereby occurs in a continuous cell stream. A fixed allocation between virtual ATM channels and time slots of the medium does not exist. On the contrary, a plurality of time slots are dynamically allocated to each virtual channel in succession dependent on the required bandwidth. The asynchronism in ATM is therefore not comprised in a time-asynchronous access onto the transmission medium but in the dynamic assigning of the bandwidth useable for a virtual channel on the basis of the plurality of required time slots.

The direct transmission of ATM cells is the most efficient, since an additional overhead due to the adaptation to the transmission frame of the medium is eliminated, instead, the cell stream is directly transmitted bit-by-bit. The critical disadvantage of direct cell transmission is thereby comprised in the incapability with

previous transmission methods in long-distance networks, since the infrastructure of these networks is based mainly on PDH and SDH systems.

The transmission via SDH is based on the nesting of a plurality of ATM cells in the synchronous transport modules of the SDH hierarchy. The transmission of ATM cells via SDH has hitherto been specified for SDH transmission rates of 155 Mbps and 622 Mbps (STM-1 and STM-4). Over and above this, the use of the STM-16 hierarchy level with 2.5 Gbps is also provided.

Like an ATM transmission via SDH, the use of existing of PDH networks is also provided by the ITU. An ATM transmission via PDH hierarchy levels was standardized between 1.5 Mbps and 139 Mbps.

In telecommunication systems, circuits that are provided for the transmission, interpretation, formatting, handling and processing of payload and supplemental data are to be fundamentally distinguished from circuits that serve for the reception, the generation, modification, synchronization and forwarding of clock signals.

Telecommunication systems have the connection to standardized transmission networks like PDH, SDH or SONET usually require a synchronization in order to achieve the necessary quality at the interface to the transmission network. Two operating modes of the synchronization are thereby distinguished. In the case of an external synchronization, a clock is directly supplied to the system from an external synchronization. Compared thereto in a synchronization via the transmission path, the clock is acquired from the received data stream of the interface and supplied to the system as synchronization source. To this end, the received data frames also include supplemental information that describe the quality of the clock signal of a collaborating party, containing this in addition to the payload information.

The clock quality is transmitted in timing marker bits in some interface types in plesiochronic digital hierarchy. In the case of SONET and the synchronous digital hierarchy, the quality of the clock signal is communicated in what is referred to as the SSM byte (synchronization status message).

Since the clock quality of a clock source with which the telecommunication system is synchronized can be variable and a reference clock can

also drop out, at least two reference clocks that are redundant relative to one another are employed for synchronization of telecommunication systems. The drop-out of a reference clock must thereby be recognized by the telecommunication and a switch must then be automatically made to the redundant reference clock.

In order to assure error-free data transmission in a telecommunication system, telecommunication systems exhibit redundancies both in the data traffic as well as in the clock handling. Fundamentally, the line redundancy and the board redundancy must be distinguished. Given the line redundancy, a line that is redundant relative to one line is established. In board redundancy, assemblies that are redundant relative to one another are present.

A distinction must be made between 1+1, 1:1 and 1:N redundancies both in line redundancy as well as in board redundancy. Given 1+1 redundancy, both units that are redundant relative to one another (lines, assemblies) have the same information in the error-free condition. One of the units is thereby selected as active units, whereas the other is on hand ("hot standby").

Given 1:1 redundancy, the two units that are redundant relative to one another carry a non-identical information in the error-free condition. A determination is thereby made as to which of the redundant units transmits or, respectively, processes information having a priority that is higher than the other unit. In case of error of the unit having the higher priority, the operation of the lower-priority unit is interrupted so that the transmission or, respectively, processing of the more important information can be continued. Given 1:N redundancy, one low-priority unit serves N other units.

When a unit such as, for example, an interface card 5, is newly configured, then the operator recites the redundancies that are desired in the telecommunication system. These redundancies are then established with software-controlled or hardware-controlled switch means. Over and above this, the information about the redundancies that have been established are maintained in data banks.

To this end, the telecommunication system has a central data bank available to it wherein data relating to each and every individual reference clock are also maintained in addition to information about the status of individual assemblies,

alarm messages about failed units and the plurality of reference clocks. These clock-specific data comprise the specification of the interface card from which the reference clock and the payload data are taken, the priority, the current quality and the availability of the reference clock as well as alarm messages regarding reference clocks that have dropped out.

In addition to the central data bank, the telecommunication system also has decentralized (local) data banks available to it to which the individual units have access. These decentralized data banks are images of the central data bank but only contain those data that are required for the respective unit. When data in the central data bank are modified, the telecommunication system also updates the decentralized data banks.

Such a modification of the central data bank ensues, for example, when a peripheral processor platform (an interface card, a clock generator) or some other unit fails, the quality of a reference clock changes or a new reference clock is established.

In traditional telecommunication systems, the operator specifies the requested redundancy both for the data traffic as well as for the clock handling upon establishment of a unit such as, for example, an interface card 5.

This has the disadvantage that settings are also possible wherein only the data traffic but not the clock handling is secured due to the presence of redundant units. The case can thereby occur that, given an outage or a reduction in quality of the clock signals, a data traffic becomes faulty due to the shifting of clock frequencies even though redundancies had been established.

The invention is thus based on the object of specifying a method for operating a telecommunication system as well as a telecommunication system having enhanced operating dependability.

This object is achieved by the subject matters of patent claims 1 and 17.

Advantageous developments of the invention are the subject matters of the subclaims.

What is particularly achieved with the invention is that, upon establishment of redundant units (lines, assemblies), redundancies relating both to the data traffic as well as to the clock handling are always established. As a result

thereof, sources of error are avoided and an enhanced failure dependability is achieved.

Further, the invention advantageously creates a method for operating a telecommunication system as well as a telecommunication system wherein the operator need not indicate the redundancy thereof upon establishment of the reference clock. This leading to a reduction of the work outlay. Over and above this, all information about established redundancies are present at the earliest possible point in time via central and decentralized data banks.

Preferred exemplary embodiments of the invention are explained in below. Shown are:

Fig. 1 an overview of clock handling units of an ATM node.

The lines, interface cards 5 and clock generators 3, 4 shown in Fig. 1 can be redundantly operated. Over and above this, further clock handling units can comprise redundancies. Finally, the data traffic units and lines (which are not shown in Fig. 1) also comprise redundancies.

According to the preferred exemplary embodiment, the operator of the telecommunication system establishes a 1+1, 1:N or 1:1 redundancy of a line or of assembly that serves the purpose of data traffic. This redundancy is deposited in a data bank. Subsequently, the redundancy of the data traffic is automatically determined with a software control and applied to the clock handling. To that end, a corresponding redundancy of the clock handling devices is set under hardware control. Subsequently, the redundant units (lines, assemblies) that have been set are established and one of the redundant units is selected for active operation. Queries of the local data bank will preferably ensue for this purpose.

The inventive method is preferably applied in an inventive telecommunication system for establishing a clock source that comprises a 1+1 line redundancy.

Patent Claims

1. Method for operating a telecommunication system that contains data traffic units (5) and clock handling units (1-4) that can comprise both lines as well as assemblies, whereby at least respectively one part can be redundantly operated, whereby the method comprises the following steps:
defining a redundancy either for the at least one part of the data traffic unit (5) or for the at least one part of the clock handling units (1-4), and establishing the defined redundancy for the at least one part for which the redundancy has been defined, characterized by the step:
establishing a redundancy corresponding to the defined redundancy for the other at least one part for which the redundancy has not been defined.

2. Method according to claim 1, characterized in that the telecommunication system is an ATM telecommunication system.

3. Method according to claim 1 or 2, characterized in that one of the steps of establishing contains a step of writing at least one data bank, which can be a central or a local data bank.

4. Method according to one of the claims 1 through 3, characterized in that the step of establishing a redundancy corresponding to the defined redundancy contains a step of determining the defined redundancy.

5. Method according to claim 4, characterized in that the step of determining the defined redundancy is software-controlled.

6. Method according to one of the claims 1 through 5, characterized in that the step of establishing the redundancy corresponding to the defined redundancy sets this redundancy hardware-controlled.

7. Method according to one of the claims 1 through 6, characterized in that the method further comprises a step of selecting one of the redundant data traffic units and clock handling units.

8. Method according to one of the claims 1 through 7, characterized in that the step of defining the redundancy ensues for at least a part of the data traffic units and the redundancy corresponding thereto is established for at least a part of the clock handling units.

9. Method according to one of the claims 1 through 8, characterized in that at least one of the defined redundancies or redundancies corresponding thereto is a board redundancy.

10. Method according to one of the claims 1 through 9, characterized in that at least one of the defined redundancies or redundancies corresponding thereto is a line redundancy.

11. Method according to one of the claims 1 through 10, characterized in that at least one of the defined redundancies or redundancies corresponding thereto is a 1:N redundancy.

12. Method according to claim 11, characterized in that the 1:N redundancy is a 1:1 redundancy.

13. Method according to one of the claims 1 through 12, characterized in that at least one of the defined redundancies or redundancies corresponding thereto is a 1+1 redundancy.

14. Method according to one of the claims 1 through 13, characterized in that at least one part of the data traffic units comprises at least one interface card (5).

15. Method according to one of the claims 1 through 14, characterized in that the at least one part of the clock handling units comprises at least one interface card (5).

16. Method according to one of the claims 1 through 15, characterized in that the at least one part of the clock handling units comprises a clock generator (1-4).

17. Telecommunication system, comprising:

data traffic units (5) for the implementation of a data traffic, whereby the data traffic units can comprise lines and assemblies and can be redundantly operated,

clock handling units (1-4) for clock handling, whereby the clock handling units can comprise lines and assemblies and can be redundantly operated,

means for establishing a redundancy of at least one part of the data traffic units (5), and

means for establishing a redundancy of at least one part of the clock handling units (1-4),

characterized in that the means for establishing are connected to one another such that the enable the establishing of the redundancy of one of the means for establishing by transferring the redundancy of the other means for establishing.

18. Telecommunication system according to claim 17, characterized in that the data traffic units comprise at least one interface card (5).

19. Telecommunication system according to claim 17 or 18, characterized in that the clock handling units comprise at least one interface card (5).

20. Telecommunication according to one of the claims 17 through 19, characterized in that the telecommunication system is an ATM telecommunication system.

21. Telecommunication system according to claim 20, characterized in that the clock handling units comprise at least one clock generator (1-4).

22. Telecommunication according to one of the claims 17 through 21, characterized in that at least one of the means for establishing is fashioned such that it has access to a central data bank.

23. Telecommunication system according to one of the claims 17 through 22, characterized in that at least one of the means for establishing is fashioned such that it has access to a local data bank.

24. Telecommunication system according to one of the claims 17 through 23, characterized in that at least one of the means for establishing comprises means for determining a redundancy.

25. Telecommunication system according to claim 24, characterized in that the means for establishing are software-controlled.

26. Telecommunication system according to one of the claims 17 through 25, characterized in that the means for establishing are fashioned such that they set the redundancies hardware-controlled.

27. Telecommunication system according to one of the claims 17 through 26, characterized in that the means for establishing comprise means for selecting one of the redundant units.

28. Telecommunication system according to one of the claims 17 through 27, characterized in that the means for establishing the redundancy of at least one part

of the clock handling units establish a redundancy corresponding to the redundancy of the data traffic units.

29. Telecommunication system according to one of the claims 17 through 28, characterized in that at least one of the redundancies is a board redundancy.

30. Telecommunication system according to one of the claims 17 through 29, characterized in that at least one of the redundancies is a line redundancy.

31. Telecommunication system according to one of the claims 17 through 30, characterized in that at least one of the redundancies is a 1:N redundancy.

32. Telecommunication system according to claim 31, characterized in that the 1:N redundancy is a 1:1 redundancy.

33. Telecommunication system according to one of the claims 17 through 32, characterized in that at least one of the redundancies is a 1+1 redundancy.

Abstract

TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR THE OPERATION THEREOF

For protecting the data traffic, telecommunication systems comprise redundancies in assemblies or lines of data traffic units and clock handling units. When establishing units such as clock sources, the redundancy of the data traffic and of the clock handling must be separately indicated. This can lead to a situation wherein only the data traffic is redundant but not the clock handling. The invention is intended to enhance the operational dependability of the telecommunication system. First, a redundancy is defined and established either for a part of the data traffic units or a part of the clock handling units. A redundancy corresponding to the defined redundancy is then likewise established for the other part. The inventive telecommunication system comprises means for establishing a data traffic redundancy and means for establishing a clock redundancy that are connected to one another.

Figure 1

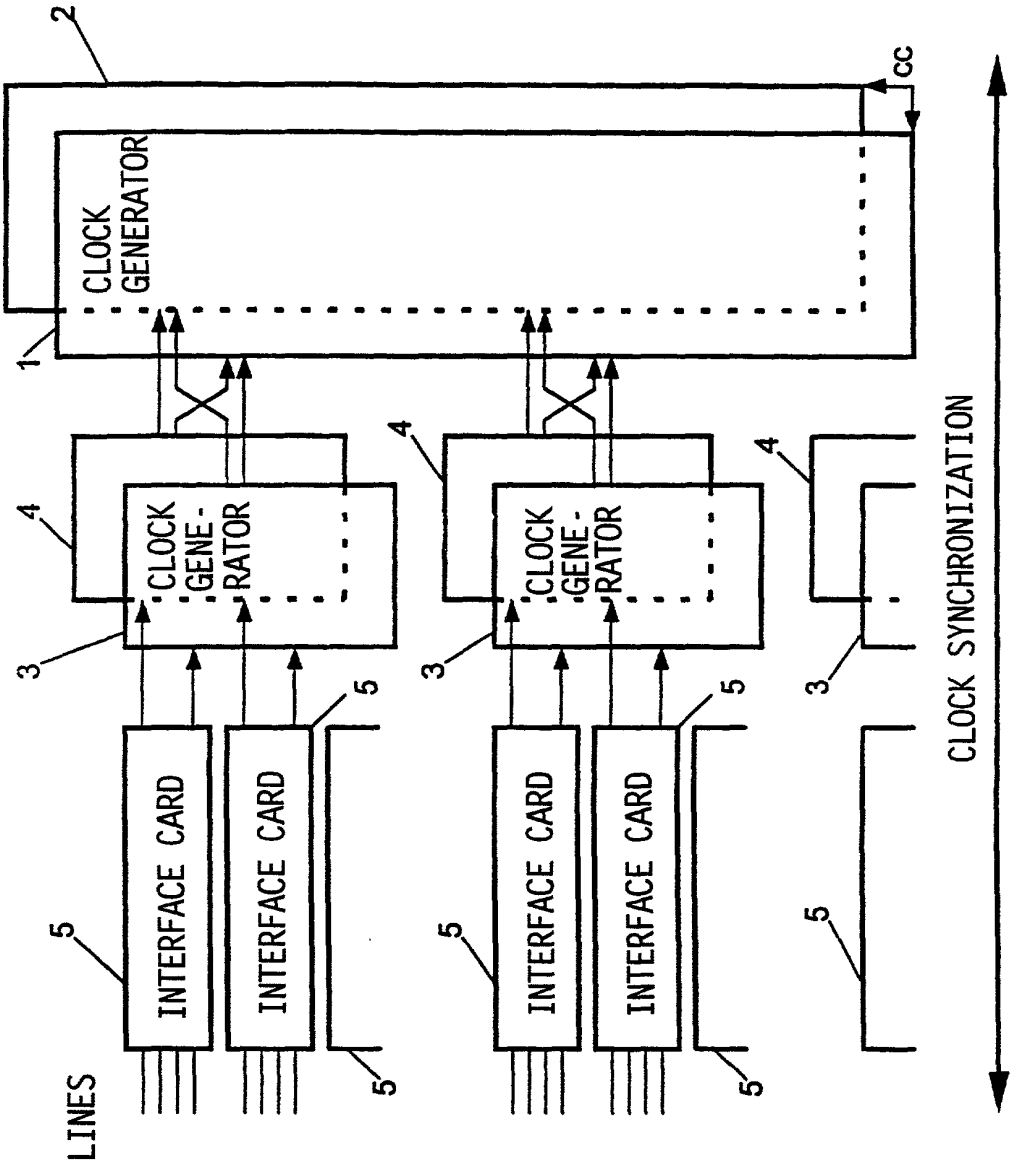

2
CC
CLOCK GENERATOR
1
4
CLOCK GENE-RATOR
3
INTERFACE CARD
5
LINES
CLOCK SYNCHRONIZATION

Fig.

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Telekommunikationssystem sowie Verfahren zum Betreiben desselben

deren Beschreibung

the specification of which

(zutreffendjhaes ankreuzen)

☒ hier beigefügt ist.

☐ am _____ als PCT internationale Anmeldung
PCT Anmeldungsnummer _____
Eingereicht wurde und am _____
Abgeändert wurde (falls tatsächlich abgeändert).

(check one)

☐ is attached hereto.

☐ was filed on _____ as PCT international application
PCT Application No. _____
and was amended on _____
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Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications
Priorität beansprucht

			Priority Claimed	
98116321.5	Germany (EP)	28. August 1998	☒	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein
			☐	☐
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	Yes Ja	No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

And I hereby appoint

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(Supply similar information and signature for third and subsequent joint inventors).

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Unterschrift des Erfinders Datum: Klaus Steinigke 7.9.99	Inventor's signature Date
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Unterschrift des Erfinders Datum	Inventor's signature Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address
Voller Name des sechsten Miterfinders (falls zutreffend):	Full name of sixth joint inventor, if any:
Unterschrift des Erfinders Datum	Inventor's signature Date
Wohnsitz	Residence
Staatsangehörigkeit	Citizenship
Postanschrift	Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).

BOX PCT
IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY--CHAPTER II

APPLICANT(S):	Stefan Hennen et al
ATTORNEY DOCKET NO.:	P01,0085
INTERNATIONAL APPLICATION NO:	PCT/EP99/06285
INTERNATIONAL FILING DATE:	26 August 1999
INVENTION:	TELECOMMUNICATION SYSTEM AS WELL AS A METHOD FOR ITS OPERATION

Assistant Commissioner for Patents,
Washington D.C. 20231

APPOINTMENT OF ASSOCIATE POWER OF ATTORNEY

Dear Sir:

I am an attorney designated on the Power of Attorney for the above-referenced application. I hereby appoint Mark Bergner (Reg. No. 45,877) as an associate attorney, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Submitted by,

(Reg. No. 31,870)
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CHANGE OF ADDRESS OF APPLICANTS' REPRESENTATIVE

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S I R:

Members of the firm of Hill & Simpson designated on the original Power of Attorney have merged into the firm of Schiff Hardin & Waite. All future correspondence for the above-referenced application therefore should be sent to the following address:

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